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54 **A vehicle seat assembly having a door stopper.**

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Description

The present invention relates to a vehicle seat assembly having safety means for protecting a passenger on the seat from injury upon a vehicle collision. More particularly, the present invention is concerned with a vehicle seat assembly having a door stopper which prevents a side door from getting into the passenger compartment upon a side vehicle collision.

A vehicle seat assembly of the type referred to in the pre-characterising clause of claim 1 is known from FR—A—2 387 143. In this conventional seat assembly there are provided two rigid rods extending outwardly toward the vehicle door and having at its extreme ends a connecting plate whereby when the vehicle door is urged into the vehicle interior said connecting plate serves to stop the getting in motion of the vehicle door.

Said conventional vehicle safety seat assembly relies necessarily upon an impact absorbing element within the door which upon a vehicle collision is deformed against the connecting plate which connects both rigid rods. The conventional seat assembly has not proved to provide a sufficient safety reliability and, hence, has not found wide acceptance.

The invention as claimed is intended to remedy these drawbacks. It solves the problem of how to design a seat assembly having a door stopper which has high safety reliability and in addition can be economically manufactured.

In particular, the invention is characterised in that said flat section is slightly spaced from and is parallel to the major surface portion of the inner wall member of the door in its closed position and in that said rigid member is connected to a member of a sliding mechanism which is mounted on the vehicle floor for permitting a sliding movement of said seat assembly in a fore-and-aft direction.

The advantages offered by the invention are mainly that the rigid member takes part in mounting the seat assembly on the sliding mechanism and, consequently, the door stopper is connected to the seat to be movable therewith. The dislocation of the seat upon a vehicle collision is carried out keeping a safety distance between the door and the seat.

Since the door stopper is movable with the seat, the ingress and egress of the passenger into and from the vehicle interior is not effected by the stopper.

According to a preferred embodiment of the present invention, a means for preventing relative sliding movement between the door and the door stopper is provided resulting in a further improved passenger protection.

Two preferred embodiments of the invention are described in detail below with reference to drawings which illustrate these two specific embodiments, in which:

Fig. 1 is a front view of a vehicle seat assembly of a first embodiment of the present invention;

Fig. 2 is a side view of the seat assembly of the first embodiment;

Fig. 3 is an enlarged perspective view of an essential section of the seat assembly of the first embodiment;

Fig. 4 is a front view of a vehicle seat assembly of a second embodiment of the present invention;

Fig. 5 is an enlarged perspective view of an essential section of the seat assembly of the second embodiment;

Fig. 6 is a sectional view taken along the line VI—VI of Fig. 5; and

Fig. 7 is a view similar to Fig. 6, but showing a side door which is deformed.

Detailed Description of the Invention

Referring to Figs. 1 to 3, particularly Fig. 1, there is shown a vehicle seat assembly 10 of a first embodiment of the invention, which is mounted in a vehicle body having a floor panel 12 and a side door 14.

The seat assembly 10 is mounted on the floor panel 12 through a sliding mechanism which permits a sliding movement of the seat assembly 10 in a fore-and-aft direction relative to the floor panel 12. Two spaced elongate brackets 16 and 18, for mounting thereon the sliding mechanism, are securely mounted on the floor panel 12 to extend in a direction parallel with the longitudinal axis of the vehicle. One bracket 16 is located adjacent a side sill 20 and the other bracket 18 is located adjacent a transmission tunnel 22, as shown by Fig. 1. The sliding mechanism comprises a pair of lower rails 24 and 26 securely mounted on the brackets 16 and 18 respectively, and a pair of upper rails 28 and 30 longitudinally slidably disposed on the lower rails 24 and 26, respectively. Although not shown in the drawing, a known locking device is arranged in the sliding mechanism to lock the upper rails 28 and 30 at a desired position relative to the lower rails 24 and 26. In Fig. 2, an operation lever 32 of the locking device is shown. The door 14 which may be of swing type or slide type is shown comprising an outer panel, an inner panel 14a and a glass.

The seat assembly 10 generally comprises a seat proper 34 and a seatback 36 which is tiltable relative to the seat proper 34. The seat proper 34 comprises a rectangular frame 38 securely mounted on the upper rails 28 and 30 of the sliding mechanism. As will become clear as the description proceeds, a characteristic measure is applied to the connection between the frame 38 and the upper rails 28 and 30. A plurality of wire springs 40 are spanned between opposed sections of the frame 38, and a cushion member 42 is mounted on the wire springs 40 to cover the frame 38. The seatback 36 comprises a rectangular frame 44, a plurality of wire springs 46 spanned parallelly between opposed sections of the frame 44, and a cushion member 48 mounted on the springs 46 to cover the frame 44. A head rest 50 is mounted on the top of the seatback 36. For achieving the pivotal movement of the seatback

36 relative to the seat proper 34, a hinge device 52 and a tilting device 54 are arranged between them. The hinge device 52 comprises a stationary arm (no numeral) secured to the frame 38 of the seat proper, a movable arm (no numeral) secured to the frame 44 of the seatback 36 and a bolt 56 pivotally connecting these arms. Although not well shown in the drawings, the tilting device 54 comprises a stationary arm secured to the seat proper frame 38 and a tiltable arm 58 fixed by bolts 60 to the seatback frame 44. A known locking device (not shown) is arranged in the tilting device 54 in order to lock the seatback 48 at a desired angular position relative to the seat proper 34. The operation lever of the tilting device 54 is designated by numeral 62.

According to the present invention, the following measure is applied to the seat assembly 10 mentioned above.

As is best seen from Fig. 1, the connection between the seat proper frame 38 and the left-positioned upper rail 28 (which is located adjacent the opening for the door 14) is made by a rigid door stopper 66 which extends along the rail 28. The door stopper 66 is constructed of a strong metal, such as a steel, and comprises, as is clearly shown by Fig. 3, a horizontal base section 66a welded to the upper rail 28, a first flat section 66b extending vertically upward from the outboard edge of the base section 66a, and a second flat section 66c extending vertically downward from the inboard edge of the base section 66a. The first flat section 66b is parallel with the major portion of the door inner panel 14a. The second flat section 66c is formed with two openings 66d through which two bolts 70 pass for secure connection between the door stopper 66 and the seat proper frame 38. As is best understood from Fig. 1, the base section 66a of the door stopper 66 has a width for providing an adequate distance or space between the first flat section 66b and the seat proper 34. The corners of the first flat section 66b is smoothly curved. A reinforcing member 68 is disposed between the base section 66a and the first flat section 66b in order to increase mechanical strength of them, and if desired, a plurality of openings 68a may be formed in the reinforcing member 68 for weight reduction, as shown. It is now to be noted that, as will be understood from Fig. 1, the first flat section 66b is located somewhat inboard of the door opening so that the door 14 does not collide against the first flat section 66b under normal closing operation of the door 14.

When the vehicle is subjected to a side vehicle collision, that is, when another vehicle collides against the door 14, the door 14 is deformed and thus urged to get into the vehicle cabin. However, the door getting-in motion is blocked safely by the first flat section 66b of the door stopper 66. It is to be noted that when the vehicle collision is violent to such a degree that the seat assembly 10 is dislocated inwardly by the impacted door 14 breaking the sliding mechanism, the dislocation of the seat assembly 10 is carried out keeping the

safely distance between the door 14 and the seat assembly 10 by the function of the door stopper 66 moved with the seat assembly 10. Thus, the passenger on the seat assembly 10 is protected from having injury.

Referring to Figs. 4 to 7, there is shown a vehicle seat assembly 10' of a second embodiment of the present invention. Similar parts to those in the first embodiment are designated by the same numerals.

As is well shown in Fig. 5, the door stopper 66 of the second embodiment has generally the same construction as that of the first embodiment except for the construction of the first flat section 66b. As shown, in the second embodiment, a plurality of equally spaced elongate openings 66e are formed in the first flat section 66b to extend along the longitudinal axis of the door stopper 66. A plurality of equally spaced conical projections are secured to the lower section of the inner panel 14a of the door 14 to extend outward of the door 14. The projections 72 are arranged to face the corresponding elongate openings 66e under normal closing of the door 14, and each of the elongate openings 66e is so sized as to receive therein the corresponding projection 72 irrespective of longitudinal displacement of the door stopper 66 induced by the operation of the sliding mechanism. (As will become apparent as the description proceeds, the projections 72 are inserted into the corresponding elongate openings 66e when the door 14 in closing position is violently pressed against the door stopper 66, for example, in a vehicle side collision.) For assuring one-to-one facing between the projections 72 and the openings 66e irrespective of the displacement of the door stopper 66, an arrangement may be employed in that the projections 72 are arranged at the same pitch "l" as the locking pitch of the locking device of the sliding mechanism and each of the elongate openings 66e has a longitudinal length greater than the effective diameter "d" of the corresponding projections 72, or another arrangement may be employed in that the projections 72 are aligned at the pitch of "2l", and each elongate opening 66e has a longitudinal length greater than "l + d". For assuring the secure connection between the projections 72 and the door inner panel 14a, a reinforcing plate 74 is attached to the inner surface of the inner panel 14a as is best shown by Figs. 6 and 7. On to the outer surface of the inner panel 14a is attached a pad member 76 of flexible material, such as a foamed rubber, which has a plurality of openings (no numeral) in which the projections 72 are placed. The pad member 76 has a thickness to almost cover the projections 72 or to allow the outer surface thereof to be flush with the leading flat ends of the projections 72 as will be seen from Fig. 6. The inner panel 14a may be recessed at the position where the pad member 76 is positioned so that the outer face of the pad member 76 is substantially flush with the major portion of the inner panel 14a, as shown. It is thus to be noted that in a normal condition, the forward and

rearward movements of the seat assembly 10' carried out by the sliding mechanism are smoothly made without obstruction of the projections 72 even when the door 14 takes its closing position.

When the vehicle encounters a side vehicle collision, the door is deformed and urged to get into the vehicle cabin. However, the door getting-in motion is blocked by the first vertical section 66b of the door stopper 66. Furthermore, upon this motion, the projections 72 on the door 14 are brought into engagement with the openings 66e of the door stopper 66, pressing down the pad members 76, as is clearly shown by Fig. 7. Thus, the relative sliding movement between the door 14 thus deformed and the door stopper 66 is suppressed, so that the undesired door getting-in motion is inhibited much more effectively.

Claims

1. A vehicle having a seat assembly mounted beside a vehicle door (14) the major surface portion of which is substantially planar, comprising a rigid member (66) secured to said seat assembly (10) to be movable therewith, said rigid member extending outwardly toward the door in closed position and having at its leading end portion a flat section (66b) which has a flat surface parallel with the major surface of an inside wall member of said door (14) in the closed position, whereby when said door is urged to get into the vehicle cabin by an external force applied thereto, said door is brought into contact engagement with said extreme end of said rigid member (66), characterised in that said flat section (66b) is slightly spaced from and is parallel to the major surface portion of the inner wall member of the door in the closed position, and in that said rigid member (66) is directly connected to a member (28) of a sliding mechanism which is mounted on the vehicle floor (12) for permitting a sliding movement of said seat assembly (10) in a fore-and-aft direction.

2. A seat assembly as claimed in Claim 1, characterised in that said rigid member has a horizontal base section (66a) secured to an upper rail (28) of said sliding mechanism and another flat section (66c) secured to a frame (38) of a seat proper (34) of said seat assembly (10).

3. A seat assembly as claimed in Claim 1, characterised by a reinforcing member (68) for reinforcing said extreme end.

4. A seat assembly as claimed in Claim 2, characterised by means (66e, 72, 74, 76) for preventing relative sliding movement between the flat section (66b) of said rigid member (66) and said door (14) upon engagement therebetween.

5. A seat assembly as claimed in Claim 4, characterised in that said means comprises a plurality of projections (72) secured to an inner panel (14a) of said door (14) to extend outward of said door, and a plurality of openings (66e) formed in said flat section (66b) for respectively

receiving therein said projections upon engagement between said flat section and said door.

6. A seat assembly as claimed in Claim 5, characterised in that said means further comprises a pad member (76) which is mounted on the outer surface of said inner panel (14a) of said door (14) in a manner to almost cover said projections.

7. A seat assembly as claimed in Claim 6, characterised in that said means further comprises a reinforcing plate (74) which is attached to an inner surface of said panel to assure the reliable connection between the projections and said inner panel.

Revendications

1. Véhicule comportant un ensemble formant siège monté auprès d'une portière de véhicule (14) dont la majeure partie de la surface est sensiblement plane, comprenant un organe rigide (66) fixé audit ensemble (10) formant siège et mobile avec celui-ci, ledit organe rigide s'étendant vers l'extérieur, vers la portière en position fermée, et comportant une partie extrême avancée plate (66b) dont une surface plate est parallèle avec la majeure partie de la surface de la paroi intérieure de ladite portière (14) en position fermée, caractérisé en ce que ladite partie plate (66b) est légèrement espacée de ladite majeure partie de ladite surface de la paroi intérieure de la portière en position fermée, et en ce que ledit organe rigide (66) est directement relié à un organe (28) d'un mécanisme de glissement qui est monté sur le plancher (12) du véhicule pour permettre un mouvement en avant et en arrière dudit ensemble (10).

2. Ensemble suivant la revendication 1, caractérisé en ce que ledit organe rigide comporte une partie horizontale de base (66a) solidaire d'une glissière supérieure (28) dudit mécanisme de glissement, et une autre partie plate (66c) solidaire du cadre (38) du siège proprement dit (34) faisant partie dudit ensemble (10).

3. Ensemble suivant la revendication 1, caractérisé par un élément de renforcement (68) pour renforcer ladite partie extrême.

4. Ensemble suivant la revendication 2, caractérisé par des moyens (66e, 72, 74, 76) empêchant le mouvement de glissement relatif entre la partie plate (66b) dudit organe rigide (66) et ladite portière (14) en cas d'entrée en contact mutuel de celles-ci.

5. Ensemble suivant la revendication 4, caractérisé en ce que lesdits moyens comprennent une série d'éléments en saillie (72) solidaires du panneau intérieur (14a) de ladite portière (14) et dépassant en saillie de ladite portière, et une série d'ouvertures (66e) formées dans ladite partie plate (66b) et recevant lesdits éléments en saillie lors de l'entrée en contact de ladite partie plate avec ladite portière.

6. Ensemble suivant la revendication 5, caractérisé en ce que lesdits moyens comprennent en outre un garnissage (76) disposé sur la surface

extérieure dudit panneau intérieur (14a) de ladite portière (14) de manière à recouvrir presque complètement lesdits éléments en saillie.

7. Ensemble suivant la revendication 6, caractérisé en ce que lesdits moyens comprennent en outre une plaque de renforcement (74) qui est fixée à la surface intérieure dudit panneau pour assurer une liaison fiable entre les éléments en saillie et ledit panneau intérieur.

Patentansprüche

1. Fahrzeug mit einer neben einer Fahrzeugtür (14) befestigten Sitzgruppe, wobei der Hauptflächenbereich der Tür im wesentlichen eben ausgebildet ist, mit einem an der Sitzgruppe (10) befestigten kräftigen Glied (66), welches mit der Sitzgruppe beweglich ist und welches sich nach außen in Richtung auf die geschlossene Tür erstreckt, und welches an seinem vorderen Endabschnitt einen ebenen Abschnitt (66b) aufweist, welcher eine ebene Oberfläche parallel zur Hauptoberfläche eines innenseitigen Wandungsgliedes der Tür (14) in deren geschlossener Stellung aufweist, wodurch, wenn die Tür in das Innere der Fahrgastkabine durch eine darauf wirkende äußere Kraft hineingedrückt wird, die Tür in Anlage mit dem äußersten Ende dieses kräftigen Gliedes (66) gebracht wird, dadurch gekennzeichnet, daß der ebene Abschnitt (66b) leicht beabstandet ist von und parallel ausgerichtet ist nach dem Hauptoberflächenabschnitt des inneren Wandungsgliedes der Tür in geschlossenem Zustand und daß das kräftige Glied (66) direkt mit einem Glied (28) eines Schiebemechanismus verbunden ist, welcher auf dem Fahrzeugboden (12) befestigt ist, um eine Schiebewegung der Sitzgruppe (10) nach vorn und nach hinten gestatten.

2. Sitzgruppe nach Anspruch 1, dadurch ge-

kennzeichnet, daß das kräftige Glied einen horizontalen Basisabschnitt (66a) aufweist, der an einer oberen Schiene (28) des Schiebemechanismus befestigt ist und einen weiteren ebenen Abschnitt (66c) aufweist, welcher an einem Rahmen des Sitzes (34) der Sitzgruppe (10) befestigt ist.

3. Sitzgruppe nach Anspruch 1, gekennzeichnet durch ein Verstärkungsglied (68) zum Verstärken des äußersten Endes.

4. Sitzgruppe nach Anspruch 2, gekennzeichnet durch eine Einrichtung (66e, 72, 74, 76) zum Verhindern einer relativen Schiebewegung zwischen dem ebenen Abschnitt (66b) des kräftigen Gliedes (66) und der Tür (14) bei gegenseitiger Berührung.

5. Sitzgruppe nach Anspruch 4, dadurch gekennzeichnet, daß die Einrichtung eine Vielzahl von Vorsprüngen (72) aufweist, welche an einem inneren Paneel (14a) der Tür (14) befestigt sind und sich aus der Tür nach außen erstrecken, und durch eine Vielzahl von Öffnungen (66e), welche in dem ebenen Abschnitt (66b) ausgebildet sind, um jeweils bei gegenseitiger Berührung zwischen dem ebenen Abschnitt und der Tür darin die Vorsprünge aufzunehmen.

6. Sitzgruppe nach Anspruch 5, dadurch gekennzeichnet, daß die Einrichtung ferner ein Kissen-glied (76) aufweist, welches an der Außenoberfläche des inneren Paneels (14a) der Tür (14) so befestigt ist, daß die Vorsprünge nahezu abgedeckt sind.

7. Sitzgruppe nach Anspruch 6, dadurch gekennzeichnet, daß die Einrichtung ferner eine Verstärkungsplatte (74) aufweist, welche an einer Innenoberfläche des Paneels befestigt ist, um eine zuverlässige Verbindung zwischen den Vorsprüngen und dem inneren Paneel zu gewährleisten.

FIG.1

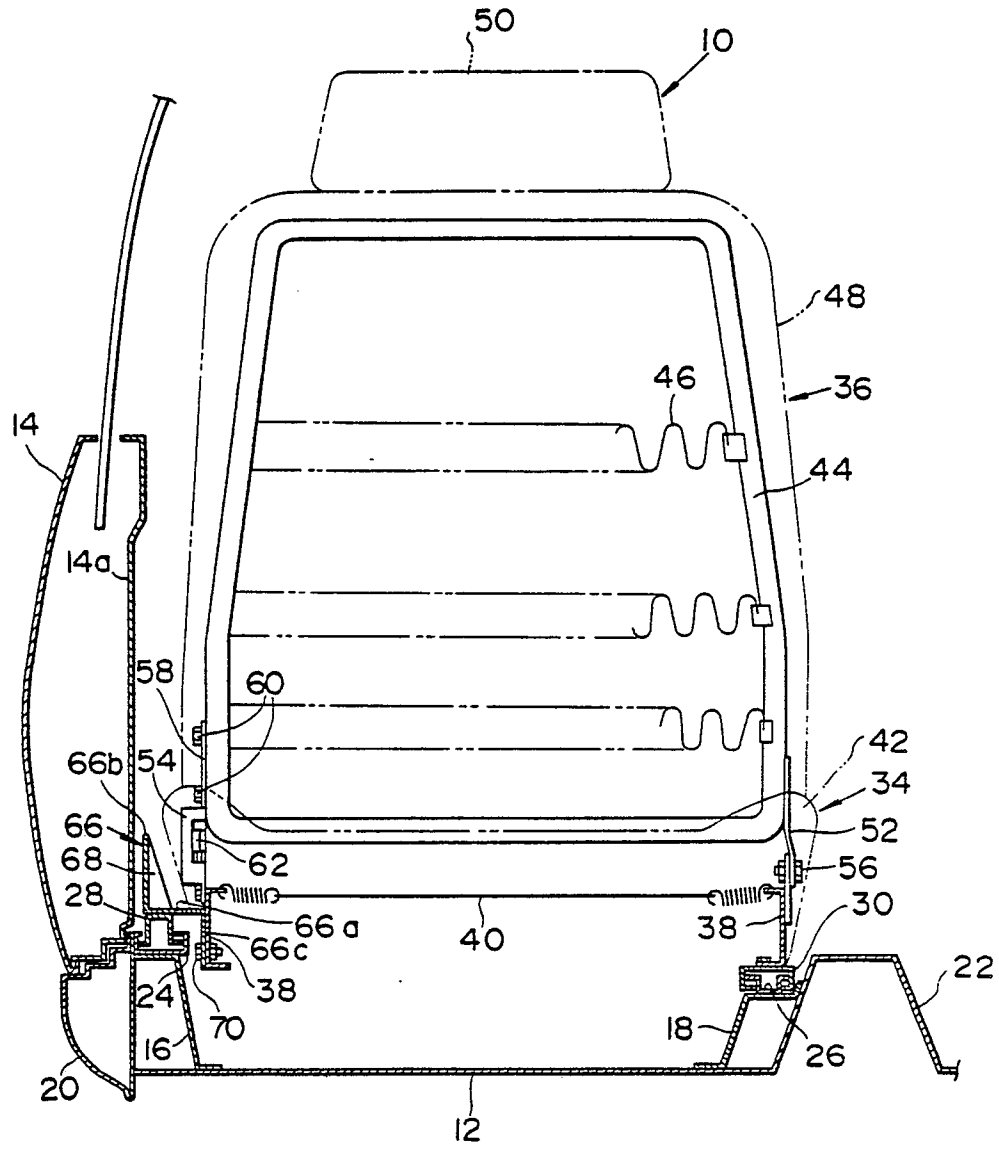


FIG. 2

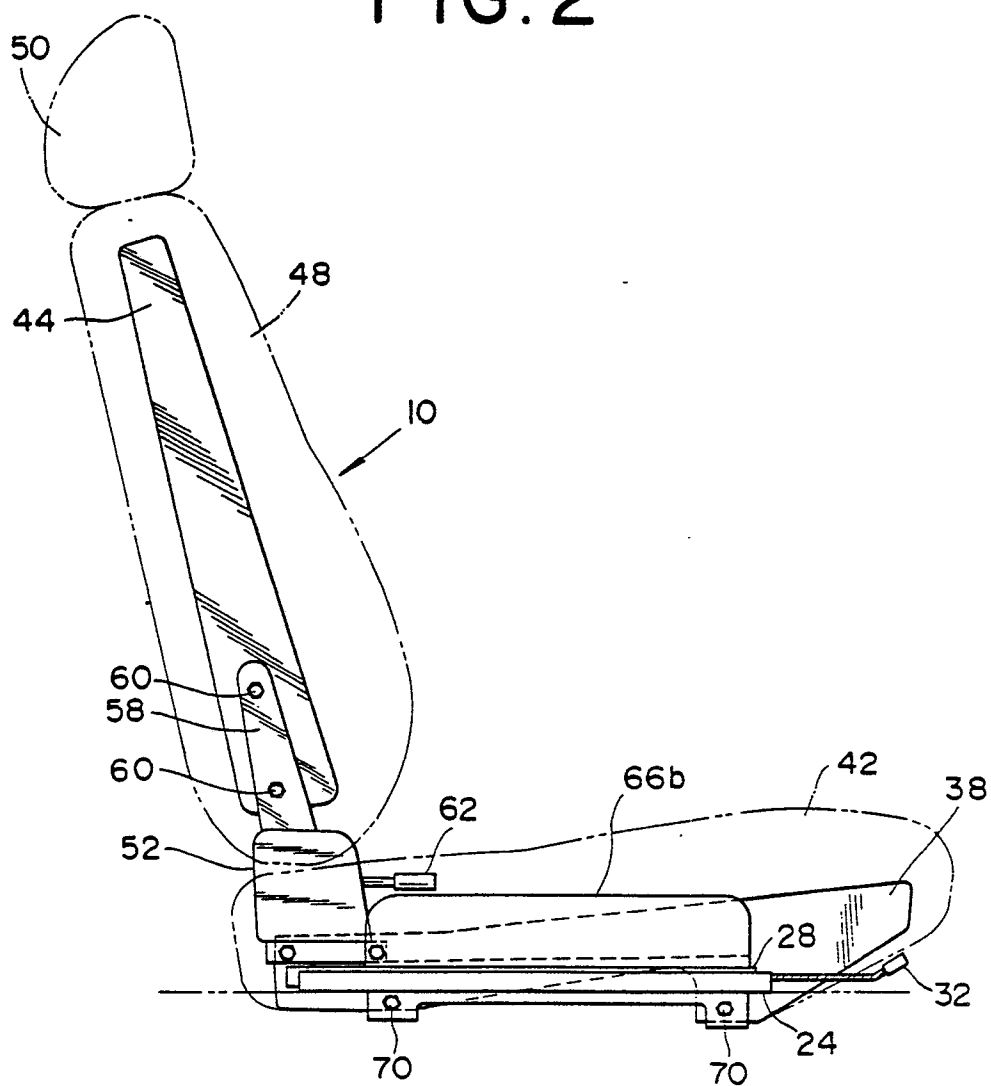


FIG. 3

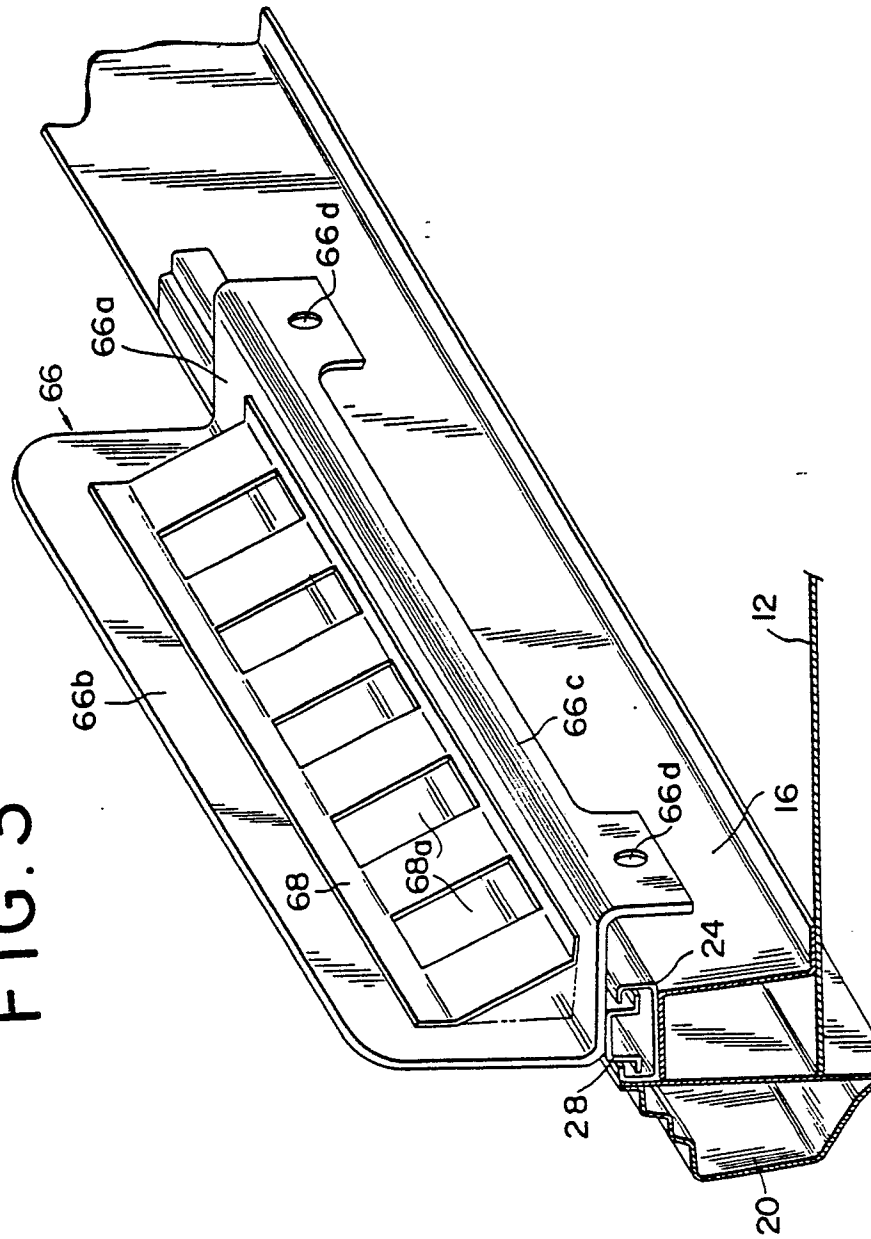
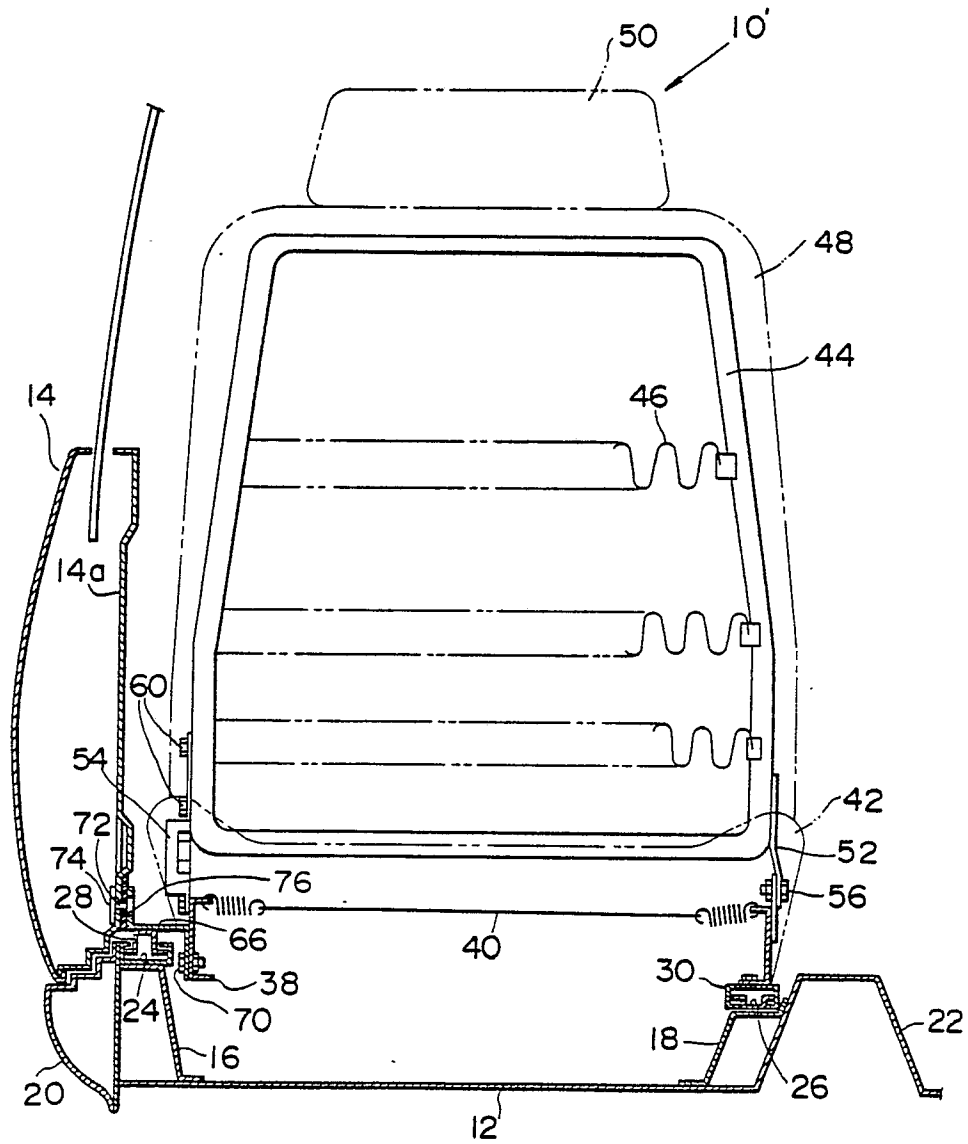


FIG.4



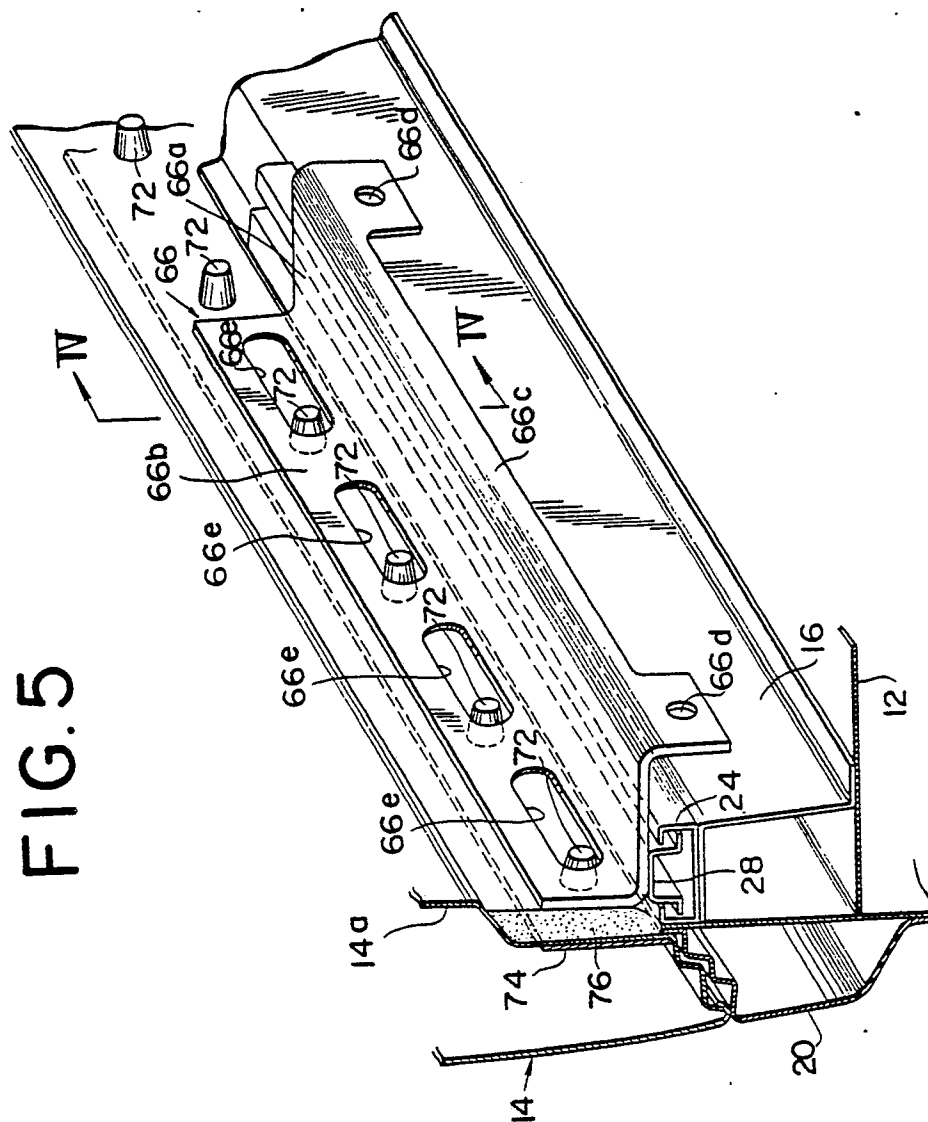


FIG.6

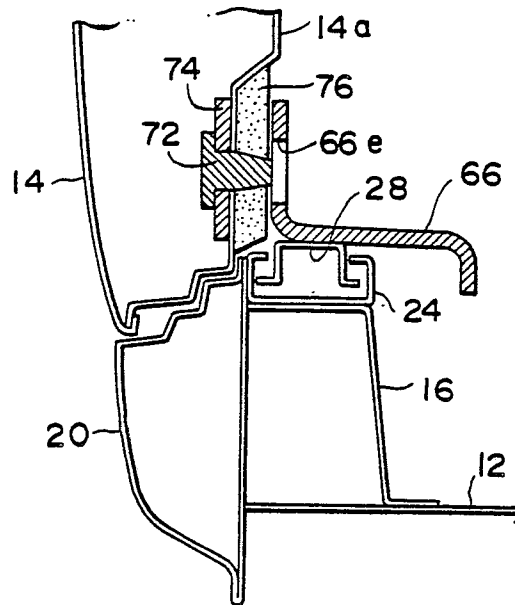


FIG.7

